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CARTOONIST

SYSTEMS/TELECOMMUNICATIONS

Create and animate your own cartoon characters
(ages 8 and up)

by **Bryan Talbot**

Requires: ATARI BASIC Language Cartridge

One ATARI Joystick Controller

Diskette version (1):
(APX-20237)

ATARI 810 or 1050 Disk Drive
32K RAM

Edition A

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Introduction

OVERVIEW

Do you ever wish that you could generate some exciting graphics with your ATARI Home Computer, but you're discouraged because it takes too much time to do the FANCY stuff? With CARTOONIST you can easily create moving displays of people, objects, or monsters from outer space. CARTOONIST lets you create a "movie", made up of frames that you design. You can play back the frames at speeds up to 200 per second. You can save the frames to a diskette to impress your family and friends later.

CARTOONIST gives you full control of your movie characteristics. The frames can be short or tall, fat or thin, different colors and different shades. CARTOONIST also provides you with time-saving functions to create displays quickly. CARTOONIST is for people who like to sit back and just have fun with the computer or polish up their programs with minimum effort.

The main idea of animation is to create a moving figure. First you create a figure and put it in the first frame of the movie. Then change him a bit, perhaps by shifting one leg just a little. Store this in the following frame. Then, move the leg just a little bit farther and store it in the next frame, and so on. After a while you've created a complete sequence for leg movement.

To animate this figure all you have to do is play the frames, one after another, at a high enough speed, and the figure seems to walk. The object of the program is to create such figures with as little effort as possible. Practically all the functions let you make these small changes easily. This way you can spend your time doing animation instead of tedious work.

REQUIRED ACCESSORIES

ATARI BASIC Language Cartridge
One ATARI Joystick Controller
ATARI 810 or ATARI 1050 Disk Drive
32K RAM

OPTIONAL ACCESSORIES

One set of ATARI Paddle Controllers

Getting started

LOADING CARTOONIST INTO COMPUTER MEMORY

1. Insert the ATARI BASIC Language Cartridge into the cartridge slot of your computer.
2. Plug your Joystick Controller into the first controller jack of your computer console.
3. Turn your computer OFF.
4. Turn on your disk drive.
5. When the BUSY light goes out, open the disk drive door and insert the CARTOONIST diskette with the label in the lower right hand corner nearest to you. Close the door. (Use disk drive one if you have more than one drive.)
6. Turn on your computer and your TV set. The program will load into computer memory and start automatically.
7. After the program has completely loaded into memory you may leave the CARTOONIST diskette in the disk drive if you only want to use the movies provided with CARTOONIST.
8. If you wish to create and save your own movies, insert a formatted disk into the disk drive slot.
9. If you'll be doing a lot of design work, label a blank formatted disk for use only with the CARTOONIST program. This way all your movies will be on one diskette, and you won't waste your time searching for the diskette that has the movie you want.
10. If this is the first time you're running the program you should leave the CARTOONIST diskette in the disk drive to play with some of the movies provided with that diskette.

THE FIRST DISPLAY SCREEN

The first display screen looks like this:

```
*****  
*      CARTOONIST      *  
*      COPYRIGHT 1983    *  
*      BRYAN TALBOT     *  
*  
*  
*  
*  
*  
*  
*  
*****
```

The disk drive beeps a couple of times and then...

A multi limbed space gidget walks right across the screen!!

This is an example of what you can accomplish using the CARTOONIST. You can keep the GIDGET walking across the screen by holding down the START button.

The drive beeps a few more times and then the following prompt appears:

PLEASE CHOOSE THE
FRAME HEIGHT

40 PIXELS

The number "40" flashes on the left side of the screen. For most purposes 40 pixels is adequate so press the joystick button to select 40.

The screen clears and displays a message that the program is loading the main part of CARTOONIST.

When CARTOONIST finishes loading into memory, follow steps 7 through 9 of the GETTING STARTED section of this manual. The screen now has a 16 by 40 frame of pixels (described later) on the left hand side, and the current menu in the box in the lower right hand corner. The number in the upper right hand corner is the frame number (also described later).

Using CARTOONIST

DEFINITION OF TERMS

Pixel

A pixel is the building block in CARTOONIST. A pixel is just like one square on a sheet of graph paper. A square can either be colored in with a pencil or left blank. CARTOONIST works on this same principle, except that the graph paper is replaced by the screen, and instead of coloring it with a pencil you fill it with a spot of light. When a pixel is lighted, it's ON. When it's blank it's OFF.

Line

A line is a horizontal line of pixels.

Frame

A frame is a collection of lines. Note that there are 24 lines of pixels on the screen. This doesn't mean that you're limited to 24 lines in a frame. Rather, you can only see 24 lines at one time. Frames can contain between 24 and 80 lines depending on what you selected just after the first display screen. Forty lines per frame is standard.

Movie

A movie is a collection of frames. The number of frames that you have in a movie depends on the number of lines that you select for a frame. If you choose 24 lines per frame you can have up to 166 frames per movie. Forty lines per frame gives you 100 frames. Eighty lines gives you 50 frames. Each frame in a movie is assigned a number. With 100 frames the frame numbers would range from 0 to 99.

Some movies may only be 10 frames long. In fact, it's possible to have several different movies located in separate sections of memory at once. For instance, you can have one movie occupying frames 0-25, while another occupies frames 30-40.

Directory

A directory is a list of all the movies on the disk. After you create a movie you can transfer it to a diskette so that you can use it later. Each movie on it has a name that you give it. When you ask for a disk directory you see a list of all the movies that are on the diskette.

Graph

The graph is an enlargement of the frame. The actual frame you design is located in the upper right hand corner of the screen. The graph is a blown up version of what appears in a frame. The graph is an array of dots that you see on the left side of the screen. Each dot represents one pixel in the frame. Actually, there are two kinds of dots: the little ones you see when you first start the program, and the big fat squares. A little dot represents a pixel being blank, or OFF. A fat square represents a pixel being lighted, or ON.

You've already noticed that there are 24 lines in the graph, yet a frame can have up to 80 lines. This inconsistency is because the graph may display one 24 line section of the frame at a time. You can easily slide it up and down, however, to show any 24 line section.

Cursor

The cursor shows where you're drawing. The cursor is like the pencil you'd use on the graph paper. You can move it about the graph and color in or erase any pixel just as you would on graph paper. The cursor looks like a large box surrounding a pixel on the graph. You control the cursor with the joystick. To color or erase a pixel, push the joystick button. If the pixel was OFF before, it flips on. If it was ON before, it flips OFF.

Menu

A menu in CARTOONIST is a list of things you may want. To do something with CARTOONIST, you pick the appropriate selection from the menu, and the program leaps to perform your every wish.

Window

The window is your information screen. The window is the large box surrounding the lower right hand portion of the screen. CARTOONIST uses the window to show you such things as menus and disk directories, and to give you information about the program.

Function

A function is something you'd like CARTOONIST to do. All functions that CARTOONIST can perform are listed in the various menus. An example of a function would be COLOR (as it's listed in the menu). This function allows you to change the color of the frame.

HOW TO DO THINGS

A) Menu operation

You choose all CARTOONIST functions from menus. There are too many functions to list them all in the window at once, so CARTOONIST offers you many menus. Each menu contains a list of related functions. For instance, the disk mode menu contains a list of all functions that pertain to disk operation.

Menus may contain not only functions, but also other menus. These menus contain specialized functions, and other menus containing even more specialized functions. Eventually a menu is so specialized that it contains only a list of functions and you can then select what you'd like to do. The general menus are referred to as the OUTER menus, while the more specialized ones are referred to as the INNER menus.

When a menu is displayed in the window, you see an arrow pointing at one of the selections. CARTOONIST is waiting for you to make a selection. Control the arrow by moving the joystick up and down. To make a selection, push the joystick button. When the button is pushed, one of two things happens:

1. If the selection is another menu, that menu shows in the window and you now see the arrow again.
2. If the selection is a function, the arrow changes color to signify that a function is being performed. Some functions may ask you a few questions before proceeding. After the function is finished the menu again displays in the window and the arrow waits for another selection.

All menus except the MAIN menu have one selection in common: BACK. BACK allows you to return to the previous OUTER menu. The MAIN menu has an END OF PROGRAM. All the menus and functions are listed in a directory at the end of this manual.

B) Special keys

Option. This key is only active in the CREATE function of the DESIGN MODE.

Select. Press the SELECT key while you're in the CREATE function, or while the arrow is shown in the window, to display the SELECT menu in the window and the arrow waits for you to make a selection. The SELECT key is, active only when in the CREATE function or when the arrow is shown in the window.

Start. The START key has three functions.

1. If you press the START key while the arrow is waiting for a selection, you see the next OUTER menu.
2. If you press the START key while a function is asking you a question or waiting for you to do something, the function halts and you returned to the menu.
3. To end some functions, you must press the START key. You'll be told which functions these are.

C) Choosing a frame

When CARTOONIST needs information about a frame, it asks you to "CHOOSE FRAME." Use the joystick to do this. The frame number is in the upper right-hand corner, and moving the joystick left or right decreases or increases the frame number by one. Moving it up or down decreases or increases the number by five. Press the joystick button to select the current frame number.

For instance, if you're asked to choose a frame number and the frame number is currently 10, move the joystick LEFT and the number subtracts 1, giving 9; RIGHT adds 1 giving 11; UP adds 5 giving 15; and DOWN subtracts 5 giving 5.

Moving the joystick in one direction makes the frame number increase or decrease.

D) Choosing first and last frame

Sometimes CARTOONIST needs to know not only one frame, but a series of consecutive frames. Therefore, choose a first and last frame to let CARTOONIST know that you mean all frames between and including these two. Choose the frames in the same manner as you would a single frame.

A few tricks are available to make the process go faster, especially when you're loading movies from disk. If you choose the first and last frame to be the same frame number, CARTOONIST assumes that you mean the first frame to be "0" and the last frame to be the last frame of the movie.

If you choose the last frame to be less than the first frame, CARTOONIST assumes that you want just the last frame to be the last frame of the movie. In other words, you're specifying the entire length of the movie following the first frame.

E) Choosing a to and from frame

CARTOONIST sometimes needs to know just two frames. Choose each frame just as you normally would.

F) Choosing a first and last line.

Some of CARTOONIST's functions let you do things to partial sections of a frame. A section is defined as two lines and the space between them. When you select a function that allows operation on a section of a frame it tells you to "CHOOSE FIRST LINE" and "CHOOSE LAST LINE." You see a triangular pointer on the left edge of the graph. Move it up or down until it's pointing at the line that you want to specify. Press the joystick button to specify that line. Do this twice, once for the first line, and once for the last line. If you specify both lines to the same line, CARTOONIST assumes that you mean the entire frame. Therefore, press the joystick button twice to specify the entire frame.

G) Entering a movie name

You only need the keyboard for one of CARTOONIST's functions: saving a movie on diskette. Details of this operation are discussed under the section titled DISK MODE.

H) Controlling both sides of a frame

Although a frame may look solid, it's actually two halves: the right and the left side. CARTOONIST lets you change the color, width, or position of each side. When you're changing these parameters, you can specify which side you want to work on. When the joystick button is not depressed, you control the right side. If you press and hold the button, you control the left side.

For example, if you want to change the color of the frame you first use the menu to choose the color function. CARTOONIST then waits for you to change the color of the frame with the joystick. If you move the joystick around without pushing the button, the color changes on the right side of the frame. If you hold the button down, the color changes on the left side. When you achieve the color combination you want, press the START key to complete the operation.

I) Use of the paddles

If you're using paddle controllers, plug them into port #2 of your computer. You might label them paddle #1 and paddle #2 with a sticker, since each has a unique use. Trace the cord coming out of the left side of the paddle plug. Refer to this one as paddle #1. The other paddle is paddle #2.

Paddle #1 is used in the ROLL FILM and the ANIMATE functions to control frame speed. Twist it completely clockwise to obtain animation speeds of up to 200 frames per second. Twist it counter-clockwise to slow animation down to about 1 frame a second.

Paddle #2 is used in the ANIMATE function only to control the sensitivity of the joystick. If you turn it completely clockwise, your figure zooms around the screen as you move it with the joystick. At the other extreme, if you turn it completely counter-clockwise, your figure moves around the screen very slowly. Speeds vary between these two positions.

J) Choosing a movie from the directory

With most of the functions using the disk drive, you choose a movie from the disk for some reason. When you choose such a function, the program begins to display all the movies on the diskette, one at a time, in the window. An arrow points to the current movie. If this is the movie you want, press the joystick button and the function is performed with that movie. If it isn't the movie you want, tap the joystick towards you a bit, and a new movie is presented with an arrow pointing at it. This continues until you've selected a movie, or all the movies on the diskette have been listed. At any point you can press the START key to return to the menu. (Note. If you pass the movie you want, you can't back up. Press the START key to return to the DISK MODE.

K) How to draw on the graph

This can only be done in the CREATE function of the DESIGN MODE.

Program functions and operations

The following is an explanation of each function or menu in CARTOONIST and its operation.

MAIN MENU SELECTIONS

Disk mode

This menu contains all functions that relate to using the disk drive.

Design mode

This menu, the heart of the program, contains most of the functions relating to the program. You do all design work using this menu.

Animate mode

This menu contains all the functions needed to run your completed movie and control the joystick and, if you have it, your paddle. You can control the frame speed, and move your creation around the screen.

End of program

This menu has only one choice, to quit the program. It's a menu instead of a function so that you have a chance of returning to the main menu in case you accidentally choose this selection.

DISK MODE

Load film

This function lets you bring a movie from a diskette into memory. Use the joystick (see "choosing a movie from the directory") to choose. The program displays these questions on the screen:

Choose the first frame

Choose the last frame

The movie then loads into memory beginning at the first frame. Any frames that fall after the last frame will be cut. (Note. An easy way to load the entire movie into memory is to press the joystick twice in response to the two prompts.)

Save film

This function allows you to save any movie in memory on a diskette:

Choose first frame

Choose last frame

Enter name

The first frame, the last frame, and all those in between will be saved on the diskette, using the name (plus the extension, ".FRM") that you typed from the keyboard. Names are considered legal if they have these characteristics:

1. At least one character and up to eight characters long.
2. Any combination of letters and numbers, with the first character being a letter.

Some examples of LEGAL names are:

MYMOVIE

FILE1234

STUFF

Q

Some examples of ILLEGAL names are

WHATISTHEMATTERWITHTHIS - too long

2SDAY - starts with a number.

You don't need to worry about typing an illegal name. CARTOONIST won't let you. Press the RETURN key when you're finished.

Disk directory

This allows you to see what movies are on the diskette. Pull the joystick towards you so that they continually appear in the window. Press the joystick button or the START key to stop the operation.

Lock film

This allows you to protect a movie on a diskette so that you can't accidentally erase it. All locked movies show up on the disk directory with an 'X' in front of them

Unlock film

This is the opposite of locking a MOVIE. It removes the protection of the lock.

Delete film

This allows you to erase a movie from diskette. You can't delete a movie that you've locked.

DESIGN MODE

Environment

Within this menu you can change all environmental parameters of a frame such as color, position, width, or pixel height.

Edit film

Within this menu are all the functions relating to changing the sequence or content of your movie. You may rearrange your movie on a frame by frame basis.

Create

This is the center of CARTOONIST. Use this function to draw your figures. When you select the create function you may draw things on the graph. Move the cursor by pushing the joystick in the appropriate direction. Turn the pixels on or off by pressing the joystick button. You can draw lines in any direction by holding down the joystick button while you push the joystick. If you move the cursor off the left edge, it appears on the same line on the right edge. The reverse is also true.

You can choose the 24-line section of the frame you're viewing by pushing the cursor against either the top or bottom edge of the graph. All pixel changes that you make on the graph appear in the frame immediately.

All function keys are active when you create. You press the SELECT key to display the SELECT menu. The OPTION key restores the frame to its contents when the create function was entered. This is useful when you're experimenting with changes to a figure and you don't want to undraw everything that you've done. (See "Examples and hints on using CARTOONIST effectively").

Select

You see this menu if you press the SELECT key. This is a collection of the most frequently used functions in this program.

Scan film

This function lets you take a look at what you have in your movie. It's also used to select a frame to work on. It works exactly like choosing a frame. Press the joystick button or the START key to stop (Note that this function appears in most menus. This is because it's useful in quite a few different applications).

ENVIRONMENT MENU

Width

This lets you control the width of the pixels on either or both halves of the frame. Pixels can be normal, double, or quadruple width. Use the button to select which half to change, and move the joystick left or right to change widths. Press the START key to stop the function. After you use this function, the frame halves may overlap or appear separated. Use the POSITION function to correct this split.

Height

If you've selected a frame height that's less than 41 pixels (CARTOONIST won't let you continue if you select a frame height greater or equal to 41 pixels), this function lets you make the pixels either double or single height. Push the joystick away from you to switch to double height. Press the START button to stop the function. Note that in double height the pixels seem blocky and square, while in single height they're rectangular. You can't specify double height or single height for individual halves of a frame.

Position

This function lets you change the position of each half of the frame in relation to the other half. Use the joystick button to select which half. Move the joystick left or right to slide the half to the desired position. Press the START key to stop.

Color

This function allows you to change the color or the shade of either half of the frame. Use the joystick button to select which half, and move the joystick left or right to control color. Move the joystick up and down to control shade. Note that the name of the color you're using appears in the bottom left hand corner of the window. All color names are a six letter abbreviation. You have 16,384 possible color combinations. Press the START key to stop this function.

Background

This function allows you to change the color of the background, using the joystick to cycle through the available colors.

Scan film

(See SCAN FILM in DESIGN MODE MENU)

EDIT FILM MENU

Insert

This function allows you to insert a blank frame anywhere in the film. This is useful if you'd like to provide additional animation in between frames.

CHOOSE FRAME

This frame and all frames following are advanced by one frame number. The last frame in the movie is lost.

Delete

This function allows you to delete a frame anywhere in the film.

CHOOSE FRAME

This frame is lost. All frames following are moved down one frame number to fill the vacancy. The last frame in the movie becomes blank.

Exchange

This function allows you to exchange any two frames in a movie.

CHOOSE 'FROM' FRAME

CHOOSE 'TO' FRAME

These two frames swap position.

Copy

This function allows you to copy any frame to any other frame. It's useful for duplicating a frame quickly.

CHOOSE 'FROM' FRAME

CHOOSE 'TO' FRAME

The two frames become identical to the first one specified.

Clear

This function allows you to clear out any consecutive group of frames. It's different from the delete function in that it doesn't move any frames down to fill the empty frames; it simply wipes them clean.

CHOOSE FIRST FRAME

CHOOSE LAST FRAME

All frames in between and including the first and last frame are cleared.

Scan film

(See explanation in DESIGN MODE MENU)

SELECT MENU

For all the following functions, pressing the trigger button in response to both FIRST LINE and LAST LINE will select the entire frame. This makes it very easy to CLEAR, FILL, INVERT, etc. an entire frame.

Next (with copy)

This function copies the current frame to the following frame and makes that the current frame. This function eliminates the task of redrawing a figure from scratch every time you move on to the next frame.

CHOOSE FIRST LINE

CHOOSE LAST LINE

These two lines and the section between them are copied to the next frame. Copying the section allows you to do animation a little bit at a time. For example, if you're making a walking man, you first make the walking legs (copying only that section to the next frames); then you do the body and swinging arms, and so on.

Next (no copy)

This function simply adds one to the current frame number without making any changes to frames. This is useful when you need to go back and do individual touch up work to each frame.

Fill

This function allows you to fill any section of a frame with ON pixels.

CHOOSE FIRST LINE

CHOOSE LAST LINE

All dots between and including these two lines are filled with dots.

Shift

This function allows you to shift any section of a frame in any direction (left, right, up, down, and diagonal). This is useful for quickly moving figures around the frame without having to completely redraw them.

CHOOSE FIRST LINE

CHOOSE LAST LINE

Push the joystick in the desired direction. The section that you choose shifts accordingly. Note that all edges shift onto the opposite edge so that no portion of the section is lost. Continue moving the joystick until you're satisfied. Press the START key to stop.

Inverse

This function allows you to invert any section of a frame. In other words, it turns all ON dots OFF, and turns all OFF dots ON.

CHOOSE FIRST LINE

CHOOSE LAST LINE

These lines, and the section between them, are inverted.

Clear

This function allows you to clear any section of a frame. It saves you the task of going around and wiping out individual dots.

CHOOSE FIRST LINE

CHOOSE LAST LINE

These lines, and the section between them, are cleared.

Merge

This menu has selections associated with mergings (See below).

Mirror

This is a function that allows you to mirror any section of a frame. This is useful for such things as making walking men face the other direction without having to completely redraw them.

CHOOSE FIRST LINE

CHOOSE LAST LINE

Move the joystick away from you or towards you to mirror in an over/under fashion. Move the joystick left or right to mirror left/right. Press START to stop.

Scan film

(See explanation in DESIGN MODE MENU)

MERGE MENU

This MENU allows you to specify how you'd like to combine two frames. To combine two frames, complete the following steps:

1. Select the desired merge type (AND, OR, XOR) by moving the arrow to the appropriate selection and pressing the button.
2. Select the DO MERGE function.

When you merge two frames, CARTOONIST goes through each frame, pixel by pixel, and compares corresponding pixel locations. It then combines them to form a new frame. By choosing a merge type you're telling CARTOONIST the conditions for merging the two frames. The best way to find out what each of these merge types does is to experiment. You will probably find (OR) the most useful.

(AND)

If the first pixel AND the second pixel are both ON, then the resulting pixel will be ON.

(OR)

If either the first pixel OR the second pixel is ON, then the resulting pixel will be ON.

(XOR)

This is an abbreviation for "exclusive or." If either the first pixel OR the second pixel is ON, (but not both), the resulting pixel will be ON.

DO MERGE

This function allows you to merge two frames together to obtain a new frame. Be sure you specify the type of merge you want before you use this function or you may obtain different results from what you expect.

CHOOSE FIRST LINE
CHOOSE LAST LINE
CHOOSE FRAME

The chosen frame merges onto the one you started with (FIRST LINE, LAST LINE). You may press START at any time and stop.

ANIMATE MODE

Animate!

This is the show off function of the program. You'll agree it deserves an exclamation point. You can see any portion of your movie at a speed you control, and you can simultaneously move your creation all around the screen using the joystick. The film keeps cycling until you press the START key to cease.

Roll film

This function allows you to see any portion of your movie at a speed you control by using paddle #1. Again, the film keeps cycling until you stop it by pressing the START key.

Paddles

Selects use of paddles. (See "Use of Paddles")

No paddles

Selects use of SPEED and SENSITIVITY functions instead of paddles.

Speed

Controls the speed of animation. Choose a value from 1 (fast) to 200 (slow) by moving the joystick to increase and decrease the value. Select the value you want by pressing the joystick button or START key.

Sensitivity

Controls sensitivity setting of the joystick. Choose a value from 1 (quick response) to 200 (sluggish response). Again, move the joystick to increase or decrease the value and select a value by pressing the joystick button or START key.

END OF PROGRAM MENU

Quit

When you choose this function, the screen clears and the computer drops into the memo pad function. Press the SYSTEM RESET key to restart the program. This wipes out anything you've done, so be sure you save any movies that you want before you QUIT.

Back

You accidentally selected this menu and want to return to the main menu without doing any damage. Consider this your second chance.

Sample session

- 1. Start the CARTOONIST program as shown in Getting Started.**
- 2. Select a height of 40 pixels. CARTOONIST will load into memory.**
- 3. Select DISK MODE from the main menu.**
- 4. Select LOAD FILM from the disk menu.**
- 5. Choose any movie from the disk directory.**
- 6. When asked for first and last frames, simply push the joystick button twice since you want to use the whole movie. The film will load into memory. Note the last frame used by the film when it comes in.**
- 7. Select BACK so that you will return to the main menu.**
- 8. Select ANIMATE mode.**
- 9. Select ROLL FILM or ANIMATE! since you want to play with the film.**
- 10. Choose first and last frames making sure that the last frame was the last frame brought in from the diskette.**
- 11. You're all set! Use the paddles and/or joystick to play around to your heart's content. You may want to slow the frame speed way down to see how the animation is accomplished. If you don't have paddles, use the START key to stop and adjust the frame speed and/or sensitivity using the SPEED and SENSITIVITY functions.**
- 12. Press the START key to stop. You may load another movie by following the steps starting with step #3.**

HINTS on using CARTOONIST effectively

1. Draw figures a bit at a time. For example, if you're making a walking man you'd first do the moving legs then go back and do the swinging arms and waving body. In this way you aren't faced with complicated motions to worry about at once. You can concentrate on one action at a time.
2. Use the NEXT(WITH COPY) function to its fullest extent. When you've finished drawing a frame follow this procedure:
 - a) Press the SELECT key. The select menu appears in the window.
 - b) Press the joystick button (since the green arrow is already pointing at NEXT (WITH COPY)).
 - c) Copy the appropriate sections to the next frame.
 - d) Move the green arrow to BACK and press the joystick button. You return to the design mode menu.
 - e) Press the joystick button (since it's already pointing at CREATE).
 - f) Draw the next frame.Although this seems complicated at first, you can do it all in a few seconds with practice.
3. If you press the SELECT key while the cursor is on the left edge of the graph, a NEXT (WITH COPY) occurs for the entire frame. Be sure not to do this accidentally.
4. Don't be meticulous when you're drawing an animation sequence. Draw a close, but quick, approximation of what you want. Then go back and use the NEXT (NO COPY) function to touch up your work.

5. Make animation scenes 'cyclic.' When they're played over and over you won't be able to tell what the first and last frame is, since the motion will be smooth. This is difficult since you have to synchronize all movements, but it makes animation much more enjoyable when you're using the ANIMATE! and ROLL FILM functions. See the movies provided with CARTOONIST for examples of how this is done.
6. Learn to think ahead so that you know what movements you need later. Then you won't have to do extensive reworking of your movies.
7. Using these hints (and some you'll come up with on your own), you can create quick and lively movies in short periods of time.

FUTURE USES

The things you can accomplish with CARTOONIST are almost unlimited. The list below includes some things you may want to try doing.

- a) Overlap the sides of the frame to creature multi-colored figures. There may be limits on the FRAME width, but the extra color might be worth it.
- b) Make exotic designs that don't look like anything at all but that swirl and change and twist and bend. Make something really HYPNOTIZING!
- c) Put action in your games. Really liven them up.
- d) Put animation to sound. Make a dancing snake or a waltzing bear.
- e) Make a game for little kids so they can control a figure and run it around the screen.
- f) ABOVE ALL... USE YOUR IMAGINATION!!

Advanced technical information

You can use CARTOONIST movies in your own programs and games. It is very easy to read CARTOONIST files. All CARTOONIST files have an .FRM suffix.

FILE FORMAT

```
##  Input #1;NUMFRAMES number of FRAMES in the file
##  Input #1;HEIGHT  number of PIXELS per FRAME,
STRING Input #1;BUFFER$  
STRING  
:  
:
```

Each string is twice as many bytes long as the frame is high and represents one frame.

For example, if the frame height was 40 pixels, each string would be 80 bytes long. The first 40 bytes would be for the left half of the frame, and the second 40 would be for the right half.

Here's a short BASIC program to read in such a file:

```
10 DIM FRAME$(100000),BUFFER$(160)
20 OPEN #1,4,0,"MEEP.FRM"
30 INPUT #1;NUMFRAMES
40 INPUT #1;HEIGHT
50 FOR X=1 TO NUMFRAMES
60 INPUT #1;BUFFER$
70
FRAME$((X,1)*HEIGHT*2+1,(X,1)*HEIGHT*2+HEIGHT*2)=BUFFE
R$  
80 NEXT X
90 CLOSE #1
100 ...
```

The first 40 bytes of FRAME\$ would be the left side of FRAME #0. The second 40 bytes would be the right half of FRAME #0. The next 40 bytes would be the left half of FRAME #1, and so on.

HOW THE ANIMATION IS DONE

Of course it's done with player/missile graphics. If you're not familiar with player/missile graphics, there's plenty of good reading around. Each FRAME in CARTOONIST is simply two players side by side. That's why the FRAMES are read in from the diskette in sections of two.

To create animation, all you have to do is put both sides of the frame in the player/missile area. That is best done using machine language, but it's possible to get speeds of up to 8 frames per second using BASIC. What's needed is a short copy routine (in machine language) that copies any section of memory to any other section of memory. You then create a loop in BASIC that calls this routine twice, once for each half of the frame, and copies the appropriate frames into the player/missile area. The animation at the start of CARTOONIST is done in this fashion.

Animation is quite easy to accomplish. All of the routines used in CARTOONIST go through the following steps:

1. Get a frame stored in memory somewhere and put it in the computer's P/M area.
2. Take care of other duties such as moving the image, reading joysticks or paddles, and other such things.
3. Depending on conditions, wait for a certain amount of time.
4. Get the next frame and go to step #1.

Animation can be done either through BASIC or through machine language. Each has its own advantages and disadvantages. Below are a few examples of each.

BASIC

Animation in BASIC is quite slow-about 10 frames per second is maximum. However, BASIC is very easy to work with, so if you don't need the high speed capabilities, BASIC is definitely the way to go. A good example of BASIC animation is in the demo program. You will need to have a machine language copy routine like the one provided to put the frame quickly in place. The rest can be done using the normal BASIC functions. The routine in the demo program is used as follows:

```
U=USR(ADR(COPY$),A,B,C)
```

A is the location to move bytes from.
B is the location to move the bytes from.
C is the number of bytes to copy.

MACHINE LANGUAGE

Machine language is a little more difficult to work with since it makes you worry about more things, but the speed gains are high. 300 frames per second is an easy thing to do once you get your routine working right. The operation of a machine language routine is about the same as a BASIC routine except that it's just more complex. To see the ROLL FILM routine that is used in CARTOONIST, load the file, ANSTART from BASIC and list lines 116 and 117. You can use this machine language routine in your programs by copying these two lines. (I'm sorry that I can't provide a source code print-out, but this was hand assembled. The ROLL FILM routine is relocatable and needs to be called in this manner:

```
U=USR(ADR(ANN$),A,B,C,D,E,F)
```

To use this you'll need to organize your movie into two strings, one containing all the left halves in sequence, the other containing all the right halves in the same manner.

- A- Base address of the first frame, left half
- B- Same for right half
- C- Base address in P/M memory for player (left)
- D- Same for player 1
- E- Number of frames to do
- F- Number of pixels per frame

Plug the paddle in port 2 to control speed and push the START key to stop.

Demo Program

There are two programs, ROUTINE and DEMO, on the CARTOONIST disk which can be used to help you incorporate your cartoons into your own programs. They contain the routines needed to retrieve movies from disk, initialize player-missile graphics, and animate your movies.

On the following two pages is a program for loading your completed cartoons into your own programs. You should play around with it and try changing values and so forth, to become familiar with how it works. Pay special attention to the "REM" statements, as they tell you what's happening, and give helpful comments.

In particular, note

Lines 20000-20120 This is the routine to load a movie from disk. Change the filename on line 20020 to load your own movie.

Lines 20500-20590 This routine initializes the player missle graphics. The REM statements indicate which values can be changed to suit your particular needs.

Lines 21000-21080 This routine contains instructions on how to display your movie. The REM statements indicate which values to change to control where the image is displayed on the screen.

Lines 21500-21590 This routine animates your movie.

Line 200 (a machine language subroutine) was deleted from the printed copy. To view the whole program, start in BASIC and use the LOAD command on filename DEMO. Then list to screen.

```

100 REM EXAMPLE CARTOONIST PROGRAM
110 REM
120 REM BY BRYAN TALBOT
130 REM
140 REM 5/18/83
150 REM
160 REM
170 REM
180 REM
190 REM
200 REM SHORT ROUTINE TO COPY GROUPS OF BYTES--LOAD PROGRAM
TO VIEW
210 GRAPHICS 8+16:POKE 106,PEEK(106)-16:GRAPHICS 0:REM
RESERVE 4K OF MEMORY SO THAT P/M GRAPHICS WILL WORK IN ANY
MODE
220 REM
230 REM
240 REM
250 REM
1000 REM ----OK START-----
1010 GOSUB 20000:REM READ IN A MOVIE FROM DISK
1020 GOSUB 10000:REM YOUR PROGRAM. HERE'S AN EXAMPLE
1030 GOSUB 20500:REM SET UP GRAPHICS
1040 GOSUB 21000:REM WHAT YOU WANT TO IMAGE TO DO
1050 GOSUB 21500:REM HOW ANIMATE IT!
1070 GOSUB 11000:REM MORE PROGRAM...
1080 PRINT :PRINT "****THE END****"      PRESS START";
1090 IF PEEK(53279)<>6 THEN 1090
1100 GRAPHICS 0:PRINT "NOW, PUSH RESET TO RESET THE MEMORY
POINTER."
1110 END
1120 REM
1130 REM
1140 REM
10000 REM ---PUT YOUR PROGRAM HERE--
10010 REM BUT HERE IS AN EXAMPLE
10020 GRAPHICS 7
10030 SETCOLOR 0,1,14:SETCOLOR 2,12,4:SETCOLOR 4,9,2:SETCOLOR
1,3,8
10040 COLOR 1:DEG
10050 FOR X=0 TO 360 STEP 20
10060 PLOT 10,10:DRAWTO 10+9*SIN(X),10+9*COS(X):NEXT X
10070 SETCOLOR 1,6,8:COLOR 2
10100 PLOT 159,79:DRAWTO 119,79:DRAWTO 119,59:DRAWTO
139,49:DRAWTO 159,59:DRAWTO 159,79
10110 FOR X=0 TO 24 STEP 8
10120 PLOT 127+X,62:DRAWTO 127+X,68:NEXT X
10130 FOR X=62 TO 68 STEP 3:PLOT 127,X:DRAWTO 135,X:PLOT
143,X:DRAWTO 150,X:NEXT X
10140 PLOT 131,62:DRAWTO 131,68
10150 PLOT 147,62:DRAWTO 147,68
10160 SETCOLOR 1,0,0
10170 POKE 82,0:POKE 752,1
10180 ? "":FOR X=1 TO 30?:CHR$(34)::NEXT X

```

```

10190 RETURN
10900 RETURN
11000 REM -----MORE PROGRAM-----
11010 GOSUB 11110:REM RING DOORBELL
11020 FOR X=1 TO 500:NEXT X:REM WAIT AWHILE
11030 GOSUB 11110:REM RING IT AGAIN
11040 FOR X=1 TO 500:NEXT X:REM WAIT AGAIN
11050 GOSUB 11200:REM ZAP HIM!
11060 RETURN :REM END
11110 FOR X=1 TO 190:NEXT X
11120 FOR X=14 TO 0 STEP -0.2
11130 SOUND 0,30,10,X
11140 NEXT X
11150 FOR X=14 TO 0 STEP -0.2
11160 SOUND 0,40,10,X
11170 NEXT X
11180 RETURN
11200 SOUND 0,200,8,14
11210 FOR X=1 TO 100:NEXT X
11220 FOR X=14 TO 0 STEP -0.2
11230 SOUND 0,200,8,X:POKE 704,0:POKE 705,X:FOR Y=1 TO 5:NEXT
Y:POKE 704,X:POKE 705,0
11240 NEXT X
11250 POKE 53248,0:POKE 53249,0
11260 RETURN
19999 REM
20000 REM ---GET MOVIE FROM DISK---
20010 DIM NAMES(15):REM NAME OF MOVIE
20020 NAMES$="D1:MORP.FRM"
20030 OPEN #1,4,0,NAMES$
20040 INPUT #1;NUMFRAMES
20050 INPUT #1,HEIGHT
20060 DIM FRAME$(NUMFRAMES*(HEIGHT*2)),BUFFERS$(160)
20070 FOR X=1 TO NUMFRAMES
20080 INPUT #1;BUFFERS$
20090
FRAME$((X-1)*HEIGHT*2+1,(X-1)*HEIGHT*2+HEIGHT*2)=BUFFERS:REM
READ ONE FRAME IN AT A TIME
20100 NEXT X
20110 CLOSE #1
20120 RETURN
20130 REM
20140 REM
20500 REM ---INITIALIZE GRAPHICS---
20510 POKE 559,62:REM SET PLAYFIELD
20520 POKE 53256,0:POKE 53257,0:REM WIDTH OF PIXELS. ALSO
EXPERIMENT WITH 1 & 3
20530 DIST=8:REM DISTANCE BETWEEN LEFT HALF OF FRAME & RIGHT.
EXPERIMENT.
20540 POKE 704,14:POKE 705,14:REM COLOR OF FRAME. EXPERIMENT.
20550 FOR X=53248 TO 53251:POKE X,0:NEXT X:REM DON'T WORRY
ABOUT THESE
20560 POKE 54279,PEEK(106):REM LOCATION OF PLAYER MISSLE
AREA.

```

```
20570 POKE 53277,3:REM ENABLE P/M
20580 MEM1=PEEK(106)*256+1024+32:MEM2=MEM1+256:REM THESE KEEP
TRACK OF WHERE THE P/M MEMORY SPACE IS LOCATED
20590 RETURN
20599 REM
21000 REM ---MOVIE 'INSTRUCTIONS'---
21010 DOWN=120:REM HOW FAR DOWN THE SCREEN IS THE MOVIE?
EXPERIMENT.
21015 MEM1=MEM1+DOWN:MEM2=MEM2+DOWN
21020 START=50:REM WHERE TO START THE IMAGE ON THE SCREEN.
EXPERIMENT.
21030 FINISH=155:REM WHERE WILL THE IMAGE FINISH. EXPERIMENT.
21040 SPEED=1:REM HOW FAST WILL IT MOVE. EXPERIMENT.
21050 FRAME1=1:REM FIRST FRAME TO BE USED.
21060 FRAME2=NUMFRAMES:REM LAST FRAME TO BE USED
21070 REM THE PROGRAM WILL KEEP CYCLING THORUGH ALL THE
FRAMES BETWEEN 1 & 2
21080 RETURN
21090 REM
21100 REM
21500 REM ----NOW ANIMATE IT!----
21510 FRM=FRAME1:REM WHICH FRAME TO PUT ON SCREEN
21520 WHERE=START:REM WHERE IS THE IMAGE ON THE SCREEN?
21530 POKE 53248,WHERE:POKE 53249,WHERE+DIST:REM LOCATED
IMAGE HORIZONTALLY
21540 U=USR(ADR(COPY$),ADR(FRAMES)+(FRM-1)*HEIGHT*2,MEM1,
HEIGHT):REM MOVE LEFT HALF INTO P/M MEMORY
21550 U=USR(ADR(COPY$),ADR(FRAMES)+(FRM-1)*HEIGHT*2+HEIGHT,
MEM2,HEIGHT):REM MOVE RIGHT HALF
21560 WHERE=WHERE+SPEED:FRM=FRM+1:IF FRM>FRAME2 THEN
FRM=FRAME1
21580 IF WHERE<FINISH THEN 21530
21590 RETURN
22000 GOTO 22000
```

ERROR MESSAGES

Although you must try very hard, it's possible to create some problems for CARTOONIST. When you do this, CARTOONIST sounds a short warning signal and displays the error message in the window. Here's a list of error messages, and what they mean:

DISK IS FULL There's no more room on your diskette for movies. Either delete some movies using the DELETE option, or use another diskette that has more room.

DIRECTORY IS FULL There's only room on a diskette for up to 64 movies, no matter how long or short they are. Follow the same procedure that you would for DISK IS FULL.

ILLEGAL CHARACTER You accidentally pushed CONTROL-3 while entering the name of the movie to save to the diskette.

CAN'T FIND FILE The movie you specified isn't on the diskette that's currently in the drive. This message is only possible if you switch diskettes before CARTOONIST has a chance to load the movie.

DISK WON'T ANSWER Either your disk drive is turned off, or a connection is loose. Check to make sure that all cables are plugged in snugly.

DISK IS PROTECTED You get this error when you try any of the disk mode menu options (except LOAD MOVIE). This diskette has a write protect sticker on the notch.

FILE LOCKED You tried to delete a movie that is locked. If you want to delete it you first must unlock it.

NEW ERROR This means you've discovered a totally new error. Congratulate yourself and then go look up the error number on the inside front cover of the Basic Reference Manual to see what you did.

Listing of the Menus and functions

MAIN MENU

DISK MODE

Load film	Loads a movie in from disk
Save film	Save a movie to disk
Disk Directory	Lists all movies on the disk
Lock film	Protects a movie against deletion
Unlock film	Removes protection from movie
Delete film	Deletes an unlocked movie
Back.	(to main menu)

DESIGN MODE

ENVIRONMENT

Width	Set width of frame pixels
Height	Set height of frame pixels
Position	Set position of either frame half
Color	Set color of frame pixels
Background	Move joystick left or right until desired color is found. Press button or START key to select
Scan film	Lets you scan the movie
Back	(to design mode menu)

EDIT FILM	
Insert	Inserts a blank frame in Movie
Delete	Deletes a frame in Movie
Exchange	Exchanges two frames
Copy	Copies one frame onto another
Clear	Clears group of consecutive frames
Scan film	Lets you scan the Movie
Back	(to design mode menu)
CREATE	
[SELECT]	
Next(with copy)	Copies current frame to next frame
Next(no copy)	Increments frame
Fill	Fills any section of a frame
Shift	Lets you shift any section of frame
Inverse	Inverts any section of a frame
Clear	Clears any section of a frame

[SELECT] CONT.

Merge	
(AND)	Sets type of merge as AND
(OR)	Sets type of merge as OR
(XOR)	Sets type of merge as exclusive or
Do Merge	Merges two frames together
Scan film	Lets you scan the movie
Back	(to select menu)
Mirror	Mirrors any section of a frame
Scan Film	Lets you scan the movie
Back	(to design mode menu)
SCAN FILM	Lets you scan the movies

ANIMATE MODE

Animate!	Plays movie. control with joystick
Roll film	Plays movie
Paddles	Selects use of paddles
No paddles	selects no paddles
Speed	Selects speed of animation
Sensitivity	Selects sensitivity of joystick
Back.	(to main menu)

END OF PROGRAM

Quit	Absolutely quits the program
Back.	(to main menu)



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Review Form

We're interested in your experiences with APX programs and documentation, both favorable and unfavorable. Many of our authors are eager to improve their programs if they know what you want. And, of course, we want to know about any bugs that slipped by us, so that the author can fix them. We also want to

know whether our instructions are meeting your needs. You are our best source for suggesting improvements! Please help us by taking a moment to fill in this review sheet. Fold the sheet in thirds and seal it so that the address on the bottom of the back becomes the envelope front. Thank you for helping us!

1. Name and APX number of program.

Cartoonist (237)

2. If you have problems using the program, please describe them here.

3. What do you especially like about this program?

4. What do you think the program's weaknesses are?

5. How can the catalog description be more accurate or comprehensive?

6. On a scale of 1 to 10, 1 being "poor" and 10 being "excellent", please rate the following aspects of this program:

- Easy to use
- User-oriented (e.g., menus, prompts, clear language)
- Enjoyable
- Self-instructive
- Use (non-game programs)
- Imaginative graphics and sound

7. Describe any technical errors you found in the user instructions (please page numbers).

8. What did you especially like about the user instructions?

9. What revisions or additions would improve these instructions?

10. On a scale of 1 to 10, 1 representing "poor" and 10 representing "excellent", how would you rate the user instructions and why?

11. Other comments about the program or user instructions:

From

STAMP

APX ATARI Program Exchange
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Santa Clara, CA 95055

(seal here)